FRUIT AND VEGETABLE INTAKE AMONG LOW INCOME HISPANIC FAMILIES WITH PRE-SCHOOL CHILDREN

By

HEIDI DANIELLE AUSTIN

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Thesis Approved:

Dr. Lenka Humenikova Shriver

Thesis Adviser

Dr. Deana Hildebrand

Dr. Janice Herman

Dr. A. Gordon Emslie

Dean of the Graduate College

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CHAPTER I

INTRODUCTION

Significance of Study

Childhood obesity is a rapidly increasing problem facing families in the United States. Currently, 25% of children in the country are considered overweight and/or at risk for overweight (Ogden 2006). Research has indicated there is an increased prevalence for the disease among children from low-income families and specific ethnic backgrounds (O'Brien, Holubkov, & Reis, 2004; Sokol, 2000). Obesity is a concern not only for the physical activity limitations and related self-esteem issues, but it is a risk factor for many serious chronic diseases such as cardiovascular disease, type 2 diabetes, hypertension, sleep apnea, and even a variety of cancers (Calza, Decarli, & Ferraroni, 2008; Freedman, Dietz, Srinivasan, & Berenson, 1999; Mariath et al., 2007; Wardle, Carnell, & Cooke, 2005). These conditions represent potentially serious problems for the children both as adolescents and then on into adulthood.

Fruits and vegetables are essential components of a healthy diet, in that they have higher nutrient content and lower energy per serving in comparison with other foods. Studies have demonstrated them to be important in preventing the occurrence of overweight and obesity, as well as aiding in the prevention of chronic diseases by

reducing associated risk factors (Epstein et al., 2001). Based on the high nutrient density of fruits and vegetables, and their low caloric content, adequate consumption often provides an effective preventive measure against the development of overweight among children, especially among young children whose dietary habits and food preferences are still forming (Cooke & Wardle, 2005; Faith, 2005; Rozin, 1990; Steiner, 1979; Wright, Parkinson, Shipton, & Drewett, 2007).

In many cases, dietary habits, including both positive and negative, developed during childhood are maintained and progress on into adulthood. For this reason, it is important to consider the fact that the majority of children in general, and not just those considered to be overweight, have less control over their food choices and are limited to the choices of their parents. This is specifically the case with pre school age children who are entirely limited to the food selections and provisions of others (Cooke et al., 2004; Fisher, Mitchell, Smiciklas-Wright, & Birch, 2002). In the case of children, in order to fully understand their dietary intake, it is necessary to evaluate the parents or primary care providers who are responsible for providing the food. It is essential to evaluate them with regards to what foods they are serving, and the factors which influence their choices.

Specific Aims

Fruits and vegetables are an essential component within the diet as they provide many nutrients, vitamins, and minerals which are necessary for proper growth and development. If children are not consuming the recommended amounts, they will be

more susceptible to illness, overweight, and a variety of health complications. Fruit and vegetable intake is often lower in minority families as well as those from lower socio-economic levels. The purpose of this study is to assess the availability of fruits and vegetables to pre-school age children from low-income Hispanic families, as well as determine the level of stage of change of the parents and evaluate factors contributing to their serving selections.

Strategies to be Employed

The evaluation of fruit and vegetable intake will be achieved using a combination of a survey and focus groups. These will allow for insight into both the availability of fruit and vegetable to the child, as well as gain insight to the factors which influence the parents to serve the foods that they serve. Additional analysis involving the level of stages of change will be carried out based on the survey responses.

Abbreviations

BMI- Body Mass Index

CDC- Centers for Disease Control

CVD- Cardiovascular Disease

FJ- Fruit Juice

FV- Fruit and Vegetables

FVS- Fruit and Vegetable Survey

HHANES- Hispanic Health and Nutrition Examination Surveys

NHANES- National Health and Nutrition Examination Surveys

SOC- Stages of Change

TTM- Transtheoretical Model

USDA- United States Department of Agriculture

WHO- World Health Organization

WIC- Special Supplement Nutrition Program for Women, Infants, and Children

CHAPTER II

REVIEW OF LITERATURE

Childhood Obesity

The prevalence of obesity among both adults and children has significantly increased in recent decades. Comparison of data from two National Health and Nutrition Examination Survey (NHANES) surveys show that among adults aged 20–74 years the prevalence of obesity has increased from 15.0% (in the 1976–1980 survey) to 32.9% (in the 2003–2004 survey) (Ogden et al., 2006). The increase in obesity has not been limited to adults, but has trickled down to adolescents, children and even toddlers. According to the Centers for Disease Control (CDC) (2006), the prevalence of overweight among young pre-school age children (age 2-5 years) has increased from 5.0% to 13.9%. This number is even higher when the age range is extended through the teenage years. Data from NHANES surveys (1976-1980 and 2003-2004) showed that for children aged 6-11 years, prevalence increased from 6.5% to 18.8%, and for those aged 12-19 years, prevalence increased from 5% to 17.4% (CDC 2008). In the 1970's, obesity rates among children aged 2 to 19 remained stable at 5%, however since 1980 the prevalence has almost tripled to 17.1% (Aronne & Isoldi, 2007).

Overweight among children is defined using the body mass index for age (BMI-for-age) which measures weight in relation to height (Barlow, Bobra, Elliott, Brownson, & Haire-Joshu, 2007; Kuczmarski et al., 2000). It is important to note that BMI does not account for percentage body fat and should not be used as a final indicator for diagnosis, but is useful in evaluating healthy weight, and the most commonly used tool for recognizing obesity within populations. Originally invented by Adolphe Quetelet, it is relatively easy to calculate and is used both in the United States and worldwide, though the units of measurement vary (Eknoyan, 2008). Since the 1980's the World Health Organization (WHO) has used BMI as reference to record general weight status (underweight, normal, overweight, and obese) within populations (WHO, 1995). The CDC designed growth charts which are age and sex specific so as to allow for growth factors during childhood. A BMI at or above the 95th percentile for children of the same age and sex is considered to be overweight (Brener, Eaton, Lowry, & McManus, 2004; Kuczmarski et al., 2000). Despite the long-term and accepted use of BMI in evaluating weight status in children, literature now warrants concern over the validity of such measures. A recent review suggests that BMI is incomplete and fails to account for the complex behavioral factors which contribute to obesity (Krebs et al., 2007), however with the ever increasing fast-paced lifestyles clinicians are forced to rely on whatever gives the fastest report, which currently remains BMI.

While the national child obesity rate is among the highest in the world, children from low-income families and from certain minority groups, including Hispanics, African Americans, and American Indians, are at an even greater risk for overweight (Kumanyika, 2006). Research has indicated Mexican-American toddlers to have the

highest prevalence of obesity rates (Warner, Harley, Bradman, Vargas, & Eskenazi, 2006). These numbers are reported for the national level, but are just as staggering if not worse for Oklahomans. According to a recent report by Trust for America's Health, Oklahoma has adult obesity rates of 28.8%, ranking as the 13th heaviest state in the nation. Based on data collected in 2004, childhood obesity rates in Oklahoma reported in at 15.4% making it the 17th heaviest in the nation (CDC, 2008).

Obesity: Health Complications

Obesity results in serious health complications both in the present and the future. Unfortunately, there is a strong correlation between the increased prevalence of obesity and increased rates of insulin resistance, metabolic syndrome, type 2 diabetes mellitus, nonalcoholic fatty liver disease, dyslipidemia, hypertension, left ventricular hypertrophy, atherosclerosis, asthma, and sleep apnea (Aronne & Isoldi, 2007; Daniels, 2006; Sullivan, Ghushchyan, & Ben-Joseph, 2008). In a population-based sample of 5-17 year olds, almost 60% of overweight children had at least one cardiovascular disease (CVD) risk factor while 25% of overweight children had two or more CVD risk factors (Freedman et al., 1999). In addition to these physical complications, many overweight children suffer from psychological problems concerning discrimination, stigmatization, and low self-esteem (Erickson, Robinson, Haydel, & Killen, 2000; French, Story, & Perry, 1995). Specific research regarding depression and obese adolescents has indicated that obese children have an increased sense of loneliness, sadness, and nervousness and are more likely to engage in risk-taking behaviors such as tobacco use and alcohol consumption

(Strauss, Barlow, & Dietz, 2000). It is not surprising that overweight children and adolescents are more likely to become obese as adults (Hedley et al., 2004). A study looking at the long term effects of overweight found that approximately 80% of children who were overweight during their adolescent children, grew up to become overweight adults considered to be obese at the age of 25 (Serdula et al., 1993; Whitaker, Wright, Pepe, Seidel, & Dietz, 1997). In a similar study which further supports this evidence, results showed that 25% of obese adults had also been overweight as children (Freedman, Khan, Dietz, Srinivasan, & Berenson, 2001). The findings of this study also indicated that if overweight begins before the age of 8 years, the extent and complications of obesity in adulthood are likely to be more severe (Taylor, Grant, Goulding, & Williams, 2005).

It is important to note the difference between overweight and obesity, though the end result is often similar. Overweight for adults is considered a BMI of 25 or greater and obese is considered to be a BMI of 30 or above. For children, the levels are slightly different and based on percentile rating on the BMI-for-age chart. At risk for overweight is considered to have a BMI-for-age between the 85^{th} and 95^{th} percentile, while overweight is considered to be in the 95^{th} percentile or above (Ogden et al., 2006). The problem is evident, and the factors behind this increase in weight must be discussed. Overweight and/or obesity are most often the result of greater energy intake than energy expenditure, which is often due to poor diet and lack of physical activity (Bensimhon, Kraus, & Donahue, 2006; Freedman, Khan et al., 2001; Warner et al., 2006). In the case of young children, the aspect of physical activity though often influenced by parents is not controlled in the same way as that of dietary intake (Guerra et al., 2006; Reilly et al.,

2006). This lack of control of dietary intake of young children in the United States, could explain a significant factor to this ever increasing obesity problem. In addition the increased prevalence of sugar and discretionary fat within the diets of young children does not help the situation. According to Warner et al., sugars and discretionary fat account for 40% of total energy intake (2006).

Factors Contributing to the Development of Obesity

There are a number of personal, behavioral, environmental, and genetic factors which contribute to the increased prevalence of overweight among children. However, researchers agree that obesity is the result of an imbalance between the energy taken in and the energy expended (Bouchard, 2008; Butte, Christiansen, & Sorensen, 2007; Swinburn, Jolley, Kremer, Salbe, & Ravussin, 2006). Therefore, behavioral factors, such as food choices, physical activity, and sedentary behavior, play a significant role in the energy imbalance (Butte et al., 2007). While many studies have investigated the likelihood of overweight being a result of genetics alone, there has been little evidence supporting this theory and the findings remain controversial (Ellis & Haman, 2004; Farooqi & O'Rahilly, 2000; Slawik & Beuschlein, 2006; Speakman, 2004). With regards to energy intake, consuming large portions of food, eating meals away from home, frequent snacking on energy dense foods, consuming beverages with added sweetener, and not consuming enough fruits and vegetables (FV) are often hypothesized as contributing to consuming excess energy (Ackroff et al., 2007; Jacobs, 2006; McCarthy et al., 2006; Rolls, 2007; Sherry, 2005; Strong et al., 2005).

Physical activity is important for children not only for benefits on body weight, but also for bone strength and blood pressure (Nemet, Berger-Shemesh, Wolach, & Eliakim, 2006; Strong et al., 2005). As overweight has increased among children and adolescents, physical activity has decreased. Daily participation in school physical education among adolescents dropped 14 percentage point over the last 13 years- from 42% in 1991 to 28% in 2003 (Brener et al., 2004). Sedentary behavior which fits right in with lack of physical activity is also partially to blame, as children spend increased amount of time watching TV, DVDs, and playing video games. Several studies have shown children to not only consume less healthy snacks which watching TV, but they are also exposed to the media's marketing tactics of unhealthy food choices (Crespo et al., 2001; Lowry, Wechsler, Galuska, Fulton, & Kann, 2002).

Environmental factors have been shown to have a strong influence on obesity development. Because children spend a lot of time at home, daycare centers, schools, and/or communities, the environment may significantly impact both children's food intake and physical activity (Schwimmer, 2005). It is the parent's responsibility within the home to provide an example and act as a role model for their children, with regards to healthy eating and making good food choices. Beyond that is the realm of childcare, which has taken a significant increase in involvement in the average American child. A recent study showed that almost 80% of children ages 5 years and younger with working mothers are in child care for 40 hours a week on average (Medicine, 2003). This significant amount of responsibility can be either beneficial or detrimental on the child's health. The next level of environment is the school which is a required environment for the majority of children and adolescents ranging in age 5-17 years old, and the food

choices available impact dietary intake (Schwimmer, 2005). While the community plays a role to some level in food availability, based on what stores and markets are available, the majority of that responsibility still falls under the home category as the parents are the ones responsible for providing the foods. The combination of all of these factors is resulting in significant increases in overweight among children in the United States.

Obesity and Low-Income Families

Though obesity is prevalent and increasing at all socioeconomic levels, it is significantly higher among those on the lower end of the spectrum. A study by Lutfiyya (2008) found that overweight children were more likely to be African American or Hispanic than white, live in households with incomes below 150% of the Federal poverty level, watch television 3 or more hours daily, and not have received preventive health care within the past 12 months. With regards to the prevalence of obesity among children from low income families, there are two specific areas of impact: (1) unsafe neighborhoods and (2) cost and accessibility of healthy foods in low-income communities. Children living in low income neighborhoods are more likely to face safety concerns, which make play less likely (Krebs & Jacobson, 2003). Lower income neighborhoods also tend to have poorer access to stores that carry healthier food choices such as fresh FV, whole grains and low-fat dairy products (Lutfiyya, Garcia, Dankwa, Young, & Lipsky, 2008). Even in cases where they are available, limited financial means often prevent purchasing.

Level of education, which is significantly lower among low-income communities, has been shown to have a correlation with both the desire and ability to serve healthy food selections, as well as an understanding for the need of a healthy diet and regular physical activity. However there is much concern for the vicious circle of weight status affecting abilities with regards to education and employment opportunity, and the lack of education and good employment resulting in increased weight status. In general, the literature suggests that, in industrialized countries, low socioeconomic status groups are more likely to be obese than are their high socioeconomic counterparts, whereas in developing countries the opposite tends to be true with individuals of higher socioeconomic status being at increased risk of obesity (Wang & Zhang, 2006). In the United States a number of studies have shown that low socioeconomic status and minority groups have a higher prevalence of obesity (O'Dea, 2003; Vieweg, Johnston, Lanier, Fernandez, & Pandurangi, 2007; Wang, Beydoun, Liang, Caballero, & Kumanyika, 2008; Wang et al., 2006).

Hispanic Americans are unfortunately quite often illustrations of both the low socioeconomic status as well as the aspect of race contributing to the obesity epidemic, though it is not limited to a particular racial group (Ahn, Juon, & Gittelsohn, 2008; Warner et al., 2006). Unfortunately many studies tend to consider African-Americans and Hispanics as a single entity, but it is essential to focus on them individually in order to identify the presence of unique factors, such as diet and geographical location, which are contributing to overweight and obesity among these groups (Butte, Cai, Cole, & Comuzzie, 2006). Data from NHANES III (1988-1994) through NHANES 2003-2004 showed that among Mexican American boys, the prevalence of overweight increased

from 14.1% to 18.3%, and among Mexican American girls there was an increase from 9.2% to 14.1% prevalence (Ogden et al., 2006). For this reason the obesity epidemic among Hispanics is an ever increasing concern which has warranted significant research in recent years, as their population numbers continue to increase in the United States.

According to research which evaluated the Hispanic trends for weight gain, it was observed that upon migrating to the United States, most individuals gain an average of twenty pounds within the first two years, largely due to dietary intake and reduced physical activity (Lindsay, Sussner, Greaney, & Peterson, 2008). Further research by this study showed that Hispanics comprised the only racial/ethnic group in which the proportion classified as overweight exceeded the percentage at risk of overweight (Bruss et al.). The issue of economic status among Hispanics is more commonly understood, as lower education levels among immigrants result in fewer employment opportunities making it difficult to afford fresh healthier foods (Lindsay et al., 2008). This creates the staggering statistic of 70% of obese or overweight Hispanic children reported to be living in households with incomes below the Federal poverty level (Lutfiyya et al., 2008). Research has also indicated that a larger proportion (36.9%) of overweight or obese Hispanic children do not get the recommended levels of physical activity when compared with overweight or obese white children. In many cases television is used not only as a babysitter, but also an English tutor among Hispanic families, further reducing the element of physical activity within the home (Mirza et al., 2004).

Fruits and Vegetable Consumption in the United States

Just as there is evidence linking obesity with health complications and diseases, there has also been evidence which indicates an association with health benefits as a result of consuming diets high in FV (Crawford, Ball, Mishra, Salmon, & Timperio, 2007; Ness & Powles, 1997; Steinmetz & Potter, 1996). The 2005 Dietary Guidelines provides recommendations which are further broken down into categories, often color related (dark green, orange, legumes) based on the fact that certain types of FV have been shown to provide specific health benefits (Cassady, Jetter, & Culp, 2007). Benefits of adequate FV consumption include reduced incidence for obesity, cardiovascular disease, stroke, diabetes, and many cancers (Cooke et al., 2004; Steinmetz & Potter, 1996). FV may reduce these above mentioned chronic diseases by their protective properties of potassium, folate, vitamins, fiber, and other phenolic compounds (Van Duyn et al., 2001). These nutrients act through mechanisms such as lowering antioxidant stress, improving lipoprotein profile, lowering blood pressure, and increasing insulin sensitivity (Dauchet, Amouyel, Hercberg, & Dallongeville, 2006). Evidence suggests that increased consumption of FV lowers risks for many cancers, especially epithelial cancers and the alimentary and respiratory tracts (Thompson et al., 1999).

In 2005, the USDA released MyPyramid (1), a food guide aimed at the general population and designed to provide nutrient adequacy while limiting commonly over consumed foods, such as those containing solid fats, and added sugars (Bachman, Reedy, Subar, & Krebs-Smith, 2008). The current recommendation for FV consumption is a minimum of 5 servings (approximately 400g) per day (Gidding et al., 2006). Recent studies show the average American to consume 3.6 servings of fruits and vegetables

(Bachman et al., 2008) Research targeted to various geographical areas of the country indicated the Midwest to have even lower consumption of 3.1 servings per day (Thompson et al., 1999).

Adults are not the only ones failing to eat their recommended amounts of FV, a study by Cullen indicated that less than 20% of children eat the recommended goal of 5 servings per day, and mean intakes have been reported between 1.5-2.5 servings per day for US children (Cullen, Baranowski, Rittenberry, & Olvera, 2000). The dietary recommendations are set in order that children will consume enough nutrients necessary for proper growth and development, however studies have shown many children's diets to be high in sugar, fat, and refined carbohydrates which do not provide the nutrients needed (Wardle et al., 2005). Of particular concern is fiber, as research indicates only 39% of children ages 2-17 meet the USDA's dietary recommendation for fiber, which is found primarily in dried beans and peas, fruits, vegetables, and whole grains (Gidding et al., 2006). Unfortunately the majority of individuals come short of meeting these recommendations. According to the Continuing Survey of Food Intakes by Individuals, less than one-third of adults and only 20% of pre-school age children consume the recommended 5 servings per day (Fisher et al., 2002; French & Stables, 2003). Due to these low consumption levels the government has developed a number of interventions, of which the most established is the "5-A-DAY" campaign. It was designed in accordance with the National Cancer Institute, with the cooperation of selected food industry representatives, to increase servings of FV to five a day (Nanney, Schermbeck, & Haire-Joshu, 2007). Within the populations of both adults and children failing to

consume adequate amounts of FV, there are a number of divisions including but not limited to race, ethnicity, socio-economic level, and education.

A significant amount of research has been focused on the element of 100% fruit juice (FJ) within the diet and how it relates to overall weight and nutrient intake. A recent study done by Nicklas et al.,(2001) evaluated the association between 100% FJ consumption and nutrient intake and weight of children ranging in age from 2 to 11 years . The study found that children drinking 100% juice consumed significantly higher levels of energy, carbohydrates, vitamins C and B_6, potassium, riboflavin, magnesium, iron, and folate, and significantly lower intakes of total fat, saturated fatty acids, discretionary fat, and added sugar. The children consuming the 100% FJ were also observed to consume significantly higher levels of whole fruit than their counterparts consuming other beverages (Nicklas et al., 2001). Despite the reported increase in energy intake, there was no significant difference in weight status and the amount of juice consumed. However, in a different study the results showed that pre-school aged children who consumed ≥12oz/day of 100% FJ had a greater prevalence of overweight (Dennison, Rockwell, & Baker, 1997). In addition to the issue of body weight with regards to increased juice consumption, there is also evidence that increased juice often replaces the intake of other necessary nutrients. A study analyzing beverage intake of preschoolers found that despite consuming a mean total beverage intake of 26.93 oz/day, the milk intake was only 12.32 oz/day, falling short of the recommended 16oz/day (O'Connor, Yang, & Nicklas, 2006). The American Academy of Pediatrics recommend that 100% juice be limited to 4 to 6 oz/day for children 1 to 6 years of age and not be given to infants under 6 months of age (O'Connor et al., 2006). In 2005 the United States

Department of Agriculture (USDA) conducted a special analysis which investigated the effect of removing FJ from the fruit recommendation, and rather substituting it with whole fruit. This recommendation was based on the fact that increasing whole fruit consumption would in no way lessen the nutrients consumed in juice, but would in fact increase the amount of fiber consumed (USDA 2004). The current dietary guidelines recommend that the intake of no more than one-third of fruit servings come from 100% FJ and no less than two-thirds come from whole fruit.

Low FV consumption is more often evident in lower socioeconomic groups. Much of the research pertaining to "low income" and "higher" considered "higher" to be indexed either by occupational status or educational level (Cooke et al., 2004). Food insecurity is a situation that is increasingly prevalent among families in the United States. The USDA defines the term "food insecurity" as "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable food in socially acceptable ways". Currently in the US, 1 in 5 children and >4 of 10 low-income children live in food insecure households (Gundersen, Lohman, Garasky, Stewart, & Eisenmann, 2008). Such insecurity often results in a diet lacking FV, and despite the shortage of food often leads to obesity (Alaimo, Olson, & Frongillo, 2001). A recent study using NHANES data (1999-2002) observed the relationship between food insecurity and maternal stressors with nutrient intake and overweight among children. The study found that among children aged 3-10 years, the interaction of food insecurity and maternal stressors was significantly linked to the probability of both consuming less nutrient dense foods, and being overweight (Gundersen et al., 2008). The study also found a significant trend towards overweight and inadequate nutrient consumption in

children with maternal stressors, but in a food secure environment. There is an increased prevalence of single parent families among lower socioeconomic levels which generally creates more stress resulting in a lack of time with children, and inability to shop for and/or cook nutritional foods(Gundersen et al., 2008). Research has found there to be a decline in "family meals" in American families of all socioeconomic levels, but even more significantly among lower income families (Larson, Story, Eisenberg, & Neumark-Sztainer, 2006; Videon & Manning, 2003). A study examining associations between family meal patterns and adolescent dietary intake found that adolescents who eat more frequently with their families consume fewer sweetened carbonated beverages and more fruits, vegetables, grains, and calcium rich foods (Gillman et al., 2000; Larson et al., 2006; Neumark-Sztainer, Hannan, Story, Croll, & Perry, 2003). This finding illustrates the impact parents have on children, which will be further discussed later.

A study by Johnson-Down (1997) revealed that poverty is associated with low intakes of Vitamin C, folate, and high intakes of total and saturated fat (Johnson-Down, O'Loughlin, Koski, & Gray-Donald, 1997). Reports indicate that groups with low purchasing power have a greater tendency to consume a poor diet lacking the recommended amounts of FV, (Perez-Lizaur, Kaufer-Horwitz, & Plazas, 2008) as well as suggest the fact that healthy diets tend to be more expensive than those which contain high levels of sugar, fat, and refined cereals (Drewnowski & Darmon, 2005a, 2005b). According to a recent report by the Centers for Disease Control (CDC), compared with low-income consumers, high-income consumers eat more of a variety of vegetables, including fresh celery, garlic, cucumbers, bell peppers, mushrooms, and tomatoes. This report also indicated that higher income individuals tend to consume more 100% FJ as

opposed to those of lower income which consume higher levels of fruit drink (less than 10% juice). This is a particular problem based on the fact that much of this consumption is due to confusion, and the parents genuinely believe they are serving their children fruit servings from these "drinks", however much of the nutrients, particularly fiber, Vitamin A, and Vitamin C are lost through the processing, in addition to significant amount of sweeteners added (Sylvestre, O'Loughlin, Gray-Donald, Hanley, & Paradis, 2007).

Previous research has shown that groups who have low purchasing power have a greater tendency to consume an unhealthy diet and fewer FV (Perez-Lizaur et al., 2008). Research by Quan et al. (2000) found that low-income adults report substantial barriers to eating more FV, with cost as an important factor affecting food choices. Additional factors include lack of availability, time and effort to prepare and eat FV, taste preferences, and habit (Quan, Salomon, Nitzke, & Reicks, 2000). With regards to differentiating between FV, research has indicated higher levels of fruit consumption as opposed to vegetable consumption among lower-income families (Cooke et al., 2004).

In addition to lower socioeconomic groups not meeting the recommended intake of FV, there is significant research to support specific ethnic groups to be especially of concern. Hispanics are one of the largest growing immigrant populations within the United States, and unfortunately their obesity rates are significantly increasing as well (Ramirez 2005). Hispanic children comprise more than 20% of the nation's kindergarten through 12^{th} grade student populations (Mennella, Ziegler, Briefel, & Novak, 2006). Language barriers, low socioeconomic status, cultural differences, and limited health care access place immigrants at risk for diminished health and well being (Larson et al., 2006). The issue of acculturation is of concern with differences between US born

immigrants, and foreign born immigrants with regards to their health and nutritional status. Research done by Larsen et al., found that the acculturation process is related to a striking increase in obesity between first and second generation Hispanic and Mexican-American adolescents. The "American" lifestyle with decreased physical activity opportunities and increased availability of high-fat energy dense foods may be part of the cause of increased overweight in second generation immigrants (Gordon-Larsen, Harris, Ward, & Popkin, 2003).

According to the National Institute of Public Health, the Mexican American adult female population consumes on average two servings of FV per day, which is below the recommended amount (Perez et al. 2007). Information from the most recent Pediatric Nutrition Surveillance Report, showed that Hispanic children age 2 to 5 years, 36% were either at risk of or overweight, compared with 27% of non-Hispanic Blacks and Whites (Lindsay et al., 2008). As previously discussed with regards to low-income families, specifically Hispanic low-income populations have reported lower than recommended FV consumption. According to the CDC, Hispanics have the highest intake of fruits at 37.2%, but the lowest intake of vegetables at 20.4% (CDC 2007). However, this report was measuring populations consuming at least 2 servings of FV per day, which is still significantly below the national recommendations. A recent study analyzing the effectiveness of the "5-A-DAY" campaign with regards to the Hispanic community found that Latino children's intake of FV falls far short of the current recommendations, and FJ accounted for a disproportionate amount of 5-A-Day intake in this population (Basch 2004). Research by Bermudez et al., using data from the Hispanic Health and Nutrition Examination Survey (HHANES) indicated not only time in the United States to

be a factor to dietary intake, but also country of origin, showing different adaptations between immigrants from Mexicans, Puerto Ricans, and Dominican Republicans (2000). The results of this study illustrate the need for targeted interventions within different populations.

Factors Influencing Children's Fruit and Vegetable Intake

There are a number of factors which are believed to contribute to FV consumption. These factors include cost, convenience, preparation methods, availability, social norms, role modeling, knowledge, self-efficacy etc. (Nicklas et al., 2001). A recent study by Young et al.(2004) determined that availability has a moderating effect on FV consumption. This availability was regarding availability within the home as it relates to the consumption of children, and availability within the markets as it relates to parent purchases (Young, Fors, & Hayes, 2004). Children's accessibility and exposure to FV, as well as their preferences are influential in determining their FV intake (Fisher et al., 2002).

In the case of children, parents are the primary party responsible for their FV intakes. Studies have found that the most influential aspect of the young child's immediate environment is the family (Nicklas et al., 2001). Although the above mentioned factors are important, it is important that the first determinate for a child is taste preference. Eating behaviors and/or preferences develop at an early age and are often carried on throughout adulthood (French & Stables, 2003). A recent study by Nicklas et al., found that the parenting techniques used in presenting food to children

carry on into adulthood rather for the positive or negative result. The results indicated that young adult eating habits such as eating all of the food on the plate, using food as an incentive or a threat, eating dessert, and eating regularly scheduled meals were related to the same feeding practices reportedly used by their parents during their childhood. In the young adults surveyed, their considerations of nutrition when electing food was related to the memory of their parents talking about nutrition during childhood (Nicklas et al., 2001).

Research has indicated that it is more common for children to prefer fruits over vegetables (Cooke et al., 2004; Wardle et al., 2005). It is the responsibility of the parent to expose the child to a variety of FV frequently, as studies have indicated frequent exposure aids in the cultivation of positive preference (Blom-Hoffman 2007). It takes the average toddler 8-10 times of exposure before he/she will try the food (Satter 2007). There is evidence that parents can influence their children's dietary intake by acting as role models, and several studies have noted that parental support and role modeling is positively related to the mother's FV intake and decreases in dietary fat among Hispanic and African-American groups (Tibbs et al., 2001). Research has found that active parents participating in the meals, not only as an overseer, but also as a partaker, significantly increase the willingness of the child to eat the foods presented (Satter 2007). Studies have indicated the recent emergence of neophobia, an avoidance of unfamiliar foods in general, as being an important predictor of low FV intake among children (Galloway, Lee, & Birch, 2003; Wardle et al., 2005). However a recent study by Wardle indicated the greater predictive power of parental control and influences to impact neophobia either for a positive or negative outcome. It is important to note the difference between control

and modeling with regards to these negative and positive outcomes. Parent modeling has been proven to be an effective method for increasing the consumption of FV among young children (Cullen et al., 2000).

Modeling, also referred to as "observational learning" has been specified to mean that people optimally learn behaviors by watching others, usually including learning how to do the behavior (a skill component) and seeing the other person positively reinforced for doing the behavior (a motivational component) (Nicklas et al., 2001). A study by Harper et al., (1975) found that toddlers put food in their mouths more readily when they were following the example of their mothers. This study also showed that children tended to sample an unfamiliar food more readily when an adult was eating it, as opposed to when it was merely offered (Nicklas et al., 2001). Just as parents can be a good example to children in their modeling, they can have a negative impact as well. A study by Cullen et al., (2000) surveying child and parent groups pertaining to their FV consumption, found parent groups to report that the lack of parent example (both their own and in general) was a reason children did not eat FV. The child groups also reported that they observed mothers eating FV only occasionally (Cullen et al., 2000). When educating parents on parents modeling it is important to emphasize the aspect of "being a good example" as opposed to bribing a child or exhibiting authoritarian control with regards to eating practices, as has been more commonly reported among Latino families in the United States (Birch, Billman, & Richards, 1984; Nicklas et al., 2001).

As parents are responsible for what foods are served and the manner in which they are prepared, alterations in preparation is also believed to be useful in changing dietary preferences (Wardle et al., 2005). In a study by Cullen et al., the results indicated

availability and accessibility to account for 35% of the variability in FV consumption (Cullen et al., 2000). Unfortunately availability is a significant issue for many parents trying to serve their children fresh FV. In cases where the family does not have a car and must walk or rely on public transportation, a simple trip to the grocery store is much more challenging (Cassady et al., 2007). In such cases, many individuals are forced to shop at local mini-marts within walking distance from the home, which either do not sell fresh produce, or sell at an elevated price making it still unattainable for low-income families (Lindsay et al., 2008).

Accessibility goes hand in hand with availability with regards to factors contributing to children's intake of FV. It is often taught by the Special Supplement Nutrition Program for Women, Infants, and Children (WIC) and other nutritional support programs that replacing unhealthy snacks with fresh FV is an excellent means of improving children's consumption (Quan et al., 2000). A study by Quan et al., (2000) found that between 65% and 82% of the women surveyed thought making keeping fruits available and having them in an accessible form for children was relatively easy to do. However with regards to vegetables, only half of the women rated eating vegetables for snacks or eating two different vegetables at dinner as an easy or somewhat easy thing to do, though 86%-88% did report keeping several forms of vegetables at home as a relatively easy thing to do. Research has shown that eating vegetables at lunch and dinner, for snacks, as well as eating salads is associated with increased FV consumption. The same study also found an association with increased fast food and restaurant dining to lower FV consumption (Crawford et al., 2007; Satia, Galanko, & Siega-Riz, 2004). Concerning the availability of FV, the issue of cost is quick to arise as a barrier to

carrying out such healthy practices. A recent study by Mushi-Brunt et al., (2007) analyzing food spending behaviors associated with FV intake, found that among children, mean combined FV servings were significantly greater for children in households spending the most on groceries than those in households spending the least. With regards to purchasing FV for snacks, the mean daily fruit and combined FV consumption were lower for both children and parents in households were parents believed they would spend more on groceries if they purchased fruits and vegetables as snacks rather than other snack foods. However the issue of cost being a barrier may not necessarily be a valid excuse for failing to consume adequate amounts of FV. A recent study by the USDA found that the purchasing of FV is relatively cost effective, when taking into account cost per edible serving per pound. The study reports that for the price of a 3oz. candy bar, consumers can eat a serving of one of 127 different FV (Mushi-Brunt, Haire-Joshu, & Elliott, 2007). The key to overcoming the cost barrier is proper education on resourceful purchasing. Having FV available in the home has been proven to increase the intake among children. A study evaluating the associations between household food availability and adolescent intakes showed that median intakes indicate that 1.3 additional servings of fruits and/or vegetables were consumed by girls in homes where FV were always available (Hanson, Neumark-Sztainer, Eisenberg, Story, & Wall, 2005). Research by Cullen et al., (2000) indicated that while many parents are aware of the need to have FV accessible (cut up, washed, etc) for children, many still fail to do so due to lack of time for preparation. Understanding the need for proper parental modeling and making foods available and accessible is essential in improving FV consumption.

In addition to increasing FV consumption, there needs to be an emphasis on changing the types of vegetables they consume to include more dark green vegetables, orange vegetables, legumes, and whole grains. Listed are examples of the above mentioned color groups: dark green vegetables- broccoli, spinach, romaine lettuce; orange vegetables- carrots and sweet potatoes; legumes-pinto beans, lima beans, and black beans. A recent study using data from the NHANES study (2001-2002) analyzed the various food groups in which Americans consume most significantly. The findings revealed Americans to lack the necessary variety in their diets to ensure adequate nutrient consumption (Bachman et al., 2008). According to the study, vegetable intakes were derived almost entirely from starchy and other vegetables (83% combined), mostly due to the fact that potatoes and tomatoes contributed 24% and 22%, while dark green vegetables were only 6%, orange vegetables 5%, and legumes 6%, which fell significantly below the recommended levels of 17%, 11%, and 17% (Bachman et al., 2008). It is important to note that five specific foods accounted for virtually all of the potatoes consumed: other white potatoes (37%), fried white potatoes (32%), potato/corn/other chips (19%), soups (6%), and beef and beef mixed dishes (3%) (Bachman et al., 2008). This is an excellent illustration of the issue of Americans not only consuming insufficient amounts of FV, but also having very little variety in their diets. An additional study found half of white potatoes consumed were consumed as either fried potatoes or potato chips. A similar finding for 1994-1996 had been reported before; suggesting potatoes continue to be consumed in high-energy-dense ways displacing other important vegetable subgroups such as the dark green and orange vegetables, and legumes (Bachman et al., 2008; Johansson & Andersen, 1998).

Transtheoretical Model: Stages of Change Theory

Implementing the above mentioned parental adaptations and dietary changes is a significant task, and understanding how people change and the most effective means of progression through change is essential to making the improvements. Most often used in health behavior modification is the Transtheoretical Model of Behavior Change (TTM). The TTM which was originally developed in the late 1970's and early 1980's by James Prochaska and Carlo DiClemente at the University of Rhode Island, has been applied to a broad range of behaviors including, but not limited to: weight loss, injury prevention, smoking cessation, and overcoming alcohol and drug addictions (Astroth, Cross-Poline, Stach, Tilliss, & Annan, 2002; Di Noia, Schinke, Prochaska, & Contento, 2006). The idea behind the Stages of Change (SOC) Model is that behavior change does not happen in one step, but rather individuals tend to progress through various stages in order to achieve the desired behavioral change. According to Prochaska, within the TTM, behavior change is conceptualized as a process that unfolds over time and involves progression through a series of six stages: precontemplation, contemplation, preparation, action, maintenance, and termination (1983).

- In the precontemplation stage, people are not thinking seriously about changing and are often opposed to, if not offended by other's offer to help. People in this stage tend to defend their current bad habit, or negative behavior and do not feel it is a problem. They may be defensive about the issue and reject outside assistance.
- In the contemplation stage people are more aware of the personal consequences of their bad habit and they spend time thinking about their problem. Although they

are able to consider the possibility of changing, they tend to be hesitant or even opposed to it. This stage often involves considering the pros against the cons.

- In the preparation stage, individuals have made a commitment to make a change.
- In the action stage, the individual believes they have the ability to change their behavior and are actively involved in taking steps to change their bad behavior by using a variety of different techniques. This tends to be the shortest of the stages.
- In the maintenance stage, the individual is actively pursuing and maintaining the new behavior. Continual reinforcement is not usually necessary, though occasional reminders are often beneficial. Ideally this should be the longest stage, as it is the desired new lifestyle.

The TTM provides a framework for understanding behavior change (Astroth et al., 2002), and is becoming increasingly used for research in health related fields as it allows distinction between individuals according to their point of change; whether they are aware of the need for change or actively pursuing the new behavior (Rosen, 2000). It is based on the understanding that the process of changing behavior is not an instantaneous occurrence but rather a process over an extended period of time (Armitage, 2006). Although this theory has been proven as an effective tool in the health related research fields, as to which specific area is dependent on several key social-cognitive and behavioral variables. These variables include decisional balance, self-efficacy, and the more recently discovered variables from Ajzen's theory of planned behavior (Armitage, 2006).

Decisional balance is deciding to commit to the behavioral change. This component was developed in order to understand what motivates an individual to begin moving through the five stages of change and is based on Janis and Mann's decision making model(Astroth et al., 2002; Norcross, Prochaska, & DiClemente, 1986) The self efficacy component originated with Bandura's theory that successful change is based on the increased level of confidence an individual demonstrates in coping with different tempting situations without relapsing (Bandura, 1977). There are ten processes of change which fall under the above mentioned stages of change, they were identified by Prochaska and DiClemente and include: consciousness raising, social liberation, dramatic relief, environmental reevaluation, self-reevaluation, self-liberation, counter conditioning, stimulus control, helping relationships, and reinforcement management (Prochaska, Crimi, Lapsanski, Martel, & Reid, 1982). Consciousness rising occurs when the individual begins to seek new information about a behavior. Social liberation occurs when the individual realizes the desired change is perceived as positive and accepted by society. Dramatic relief begins in the contemplation stage and refers to the affirmative aspects of change. Simultaneously environmental reevaluations occur as the individual assesses the areas in which the change will have the most impact; this can also lead to self-reevaluation which is an emotional and cognitive reappraisal of the desired new behavior. Self liberation occurs when the choice to change becomes a commitment to change. The remaining 4 processes occur once the individual moves into the action stage and onto the maintenance stage.

Evidence of the effectiveness of implementation using the TTM was found in a study by Nooijer et al. (2005) in which the respondents in the implementation group

reported a high frequency of eating an extra serving of fruit per day (De Nooijer, Van Assema, De Vet, & Brug, 2005) A study evaluating the factors related to the stages of dietary change resulted in findings supporting the use of the TTM to first determine the stage of the individual before implementing an intervention. The results indicated dietary interventions tailored to the individual's stage increased self-efficacy and ways to make vegetables more desirable and easily accessible (Van Duyn et al., 2001). When adopting a new behavior the individual often times ways the pros and cons of the desired change, as previously described decisional balance. Research by Ma et al., (2002) illustrates the importance for including decisional balance and self-efficacy as outcome measures. The study examined the stages of change, decisional balance, and self-efficacy constructs in relation to fruit and vegetable intakes by young adults. The results indicated by the linear trend and crossover point between pros and cons, that the TTM is applicable for assessing FV consumption (Ma et al., 2002). The crossover point as mentioned in the previous study has been found to occur during the contemplation, preparation, or action stage (Prochaska, 1994). In the action stage, the pros continue to remain high while the cons continue to recede in importance (Astroth et al., 2002; Marcus & Simkin, 1994). During the maintenance stage, it is not uncommon for the pros to decline, but not below the cons.

With regards to ethnic populations there are fewer studies specifically targeted to implementing the TTM for dietary change, however one study by Reimer et al. (2003), evaluated the TTM on a number of areas with regards to an ethnic population in low-income families. The results indicated health concerns were an issue for most mothers, and the relationship to low fruit and vegetable intake was understood. Questions concerning food preparation and availability placed a higher number of women in later

stages as they reported buying fruits and vegetables to have available for snacks and increasing vegetables served with dinner. Mothers in the preparation stage tended to "sneak" vegetables into dishes hoping the children would consume without noticing. The results of this study show that low-income women influenced their children's intake of fruits and vegetables in a number or ways depending on their stage of change (Reimer 2003). The TTM has been proven an effective means of understanding and implementing change related to dietary behaviors, however accurate staging is essential in the success of the model and intervention (Ma, Betts, Horacek, Georgiou, & White, 2003) Based on the previous stated literature, the issue of low FV consumption is of concern, and children from low-income Hispanic families have a reported prevalence of this problem. As mentioned there are a number of consequences that are associated with a diet low in FV, therefore it is essential to determine the current intake of FV as well as the factors which influence such food choices.

Summary

The purpose of this study was to evaluate the amount, frequency, and type of FV served by low income Hispanic parents to their preschool age children. Also under evaluation were the factors that encourage and/or discourage low-income Hispanic parents from serving more fruits and vegetables to their children. By gaining an understanding of the current practices of the surveyed parents related to serving more fruits and vegetables, effective intervention programs aimed at increasing FV consumption can be designed for this target population.

CHAPTER III

METHODOLOGY

Study Design, Location, and Subject Recruitment

The study was a descriptive cross-sectional study and used a convenience sampling method. The target population of this study was primary care providers who had preschool aged children currently enrolled in Head Start programs in Tulsa, Oklahoma. In addition to being a parent or guardian the inclusion criteria also required being of Hispanic ethnicity as well as being considered low-income with regards to socio-economic status. Head Start was selected in part due to the fact that enrollment requires being 150% below the poverty level. Subjects were recruited based on convenience and were recruited during the morning drop off time period (between the hours of 8:30 and 9:00 a.m.) at two predominantly Hispanic Head Start centers. The study was approved by the Institutional Review Board at Oklahoma State University.

The study took place in Head Start Programs of the Community Action Program in Tulsa, OK. The agency was collaborating with the Oklahoma State University Cooperative Extension Community Nutrition Education Program, and agreed to provide feedback and assistance throughout the research study. Enrollment in Head Start

Programs ensured that the study participants had low socioeconomic status. Two specific sites, Reed and Disney were selected for the study based on their locations in geographical areas of Tulsa which were predominantly populated with Hispanic families.

Subjects were recruited for the study directly at the Head Start sites. Parents were notified of the project via flyers posted at the centers describing the purpose of the study, nature of the subject's involvement, as well as any risks and/or benefits associated with participation. Participation was completely voluntary. During the recruitment phase of the study, bilingual Head Start staff assisted in the communication with those potential participants whose primary language was Spanish.

Interested participants were asked to come to the Head Start site during the designated time to enroll in the study. Subjects were given a consent form which was reviewed and explained by a trained research assistant. Upon providing written informed consent, participant's names were recorded by a Head Start personnel in order to insure only one representative per family was surveyed. However, subjects remained anonymous to protect their confidentiality. Participants were given $15 incentive upon completion of the survey. There were a total of 86 participants surveyed from the two sites.

In addition to the survey participants, a new cohort of parents/guardians was recruited to participate in several focus groups. The sample was a convenience sample consisting of parents from the previously surveyed Head Start sites. Parents were notified of the focus groups through informational flyers sent home with their children. It was indicated that previous participation in the survey was preferred. Subjects were given $25 as compensation for their participation. The groups were led by a trained

moderator, who had work experience within the Head Start program and was given a list of questions to facilitate the desired discussion. There were a total of three one-hour focus groups held during February 2008, with 5 to 12 participants. .

Fruit and Vegetable Survey (FVS)

Information from the primary care providers was gathered using a previously developed and validated Fruits and Vegetable Survey (FVS) (Eivens, 2005) The survey was detailed in explanation as to proper method of completion. Subjects were given their choice of either an English or Spanish translation of the survey, and research assistants with knowledge of the survey and fluent in both languages were available to assist if needed. The survey was divided into sections consisting of demographical information, intention to serve (specifically serving sizes and amounts), pros and cons to serving, confidence in serving, strategies for serving, and FV types and frequencies. The demographic portion asked questions relating to information directly involving the primary care provider. Questions included inquiries as to age, gender, employment, education, race, ethnicity, and a section verifying that the participant met the inclusion criteria relating to being a parent/guardian as well as the necessary income status.

A staging logarithm was used for stratifying parents/guardians into five stages of change based on their intention to serve more fruits and vegetables to their children in the next 6 months. Parents were also asked questions regarding the amount of fruits and vegetables served and the length of time they had been served. Examples of questions included: “How many cups of fruits and vegetables do you usually serve your preschool

age child each day?" The answer options included: "less than 2 ¼ cups each day" and "more than 2 ½ cups each day." If parents/guardians reported that they served less than 2 ¼ cups each day, they were directed to the following question: "Do you plan to start serving more than 2 ½ cups of fruit and vegetables to your preschool age child each day?" Answer options for this question included: "No, I do not plan to serve more fruits and vegetables each day in the next 6 months;" "Yes, I do plan to serve more fruits and vegetables in the next 6 months;" Yes, I do plan to serve more fruits and vegetables in the next 30 days." Parents who initially answered "yes" they did serve more than 2 ½ cups fruit and vegetables each day were then asked questions with regards to the length of time they had been practicing this behavior, in order to stage them in one of the 5 stages.

The survey also contained questions related to the constructs of TTM including: decisional balance, self-efficacy, and processes of change. There were 6 items relating to decisional balance in which parents/guardians were asked to report according to level of importance. Questions were pertaining to the expense of fruits and vegetables, long term health benefits, too much preparation time, short term health benefits, increased trips to the store, and maintaining healthy body weight. The answers included: "not important," "slightly important," "somewhat important," very important," and "extremely important." There were 5 questions relating to self-efficacy, in which the participant was asked to report their level of confidence of serving FV for questions pertaining to the following items: preparing meals at home, when eating away from home, preparing tasty meals, with limited funds for groceries, and insufficient time to cook. This section was followed by 13 questions related to cognitive and behavioral processes. Questions were structured in order that responses were based on a time continuum of: "never," "hardly ever,"

"sometimes," "often," and "all of the time." Questions involved behaviors such as looking for alternatives to presenting more fruits and vegetables by alternative recipes of frequenting different stores. Others were directed to modeling and the motives behind serving more fruits and vegetables.

The final component of the survey was a food frequency questionnaire pertaining to fruit and vegetable servings. The section was divided according to fruits and vegetables with the vegetables sub-divided according to type of vegetables based on color, specifically the groups; dark green, yellow/orange, and legumes. Fruit servings were also included both with and without 100% FJ. Each set asked how often the food item was served and then the size of the serving. The frequency questions offered answer selections anywhere from never, monthly, weekly, daily, and then in best case scenario; multiple times a day. The servings sized were divided into small (1/2 cup or less), medium (3/4 cup), or large (1 cup or more). The focus groups were recorded and transcribed by a native Spanish speaking individual. Content analysis was used to identify common themes related to FV that emerged during the focus groups.

Statistical Analysis and Hypotheses

The Statistical Package for Social Sciences (SPSS 16.0, version for Windows, Chicago, IL, 2008) was used for statistical analyses. Descriptive statistics were used to describe the sample. An analysis of variance (ANOVA) was conducted for the sample of parents/guardians using stages of change as the independent variable and the TTM construct scales as dependant variables. The level of significance was set at $P<.05$.

Based on the results of previous studies, it was hypothesized that Hispanic parents from low income families were not serving the recommended amount of 5 servings of fruits and vegetables to their pre school age children. It was also hypothesized that the amount of fruits served would be significantly higher than the amount of vegetables served by Hispanic parents.

Research Question 1: Is the quality of vegetables served to preschool children lower than desired with inadequate amount of dark green and orange vegetables?

Research Question 2: Are cost and time the factors primarily responsible for Hispanic parents of low income families not serving their children the recommended FV?

Hypothesis 1: Hispanic parents of low income families are not serving their pre school age children the recommended amount of fruits and vegetables.

Hypothesis 2: Hispanic parents of low income families serve more fruits than vegetables to their pre-school age children.

CHAPTER IV

FINDINGS

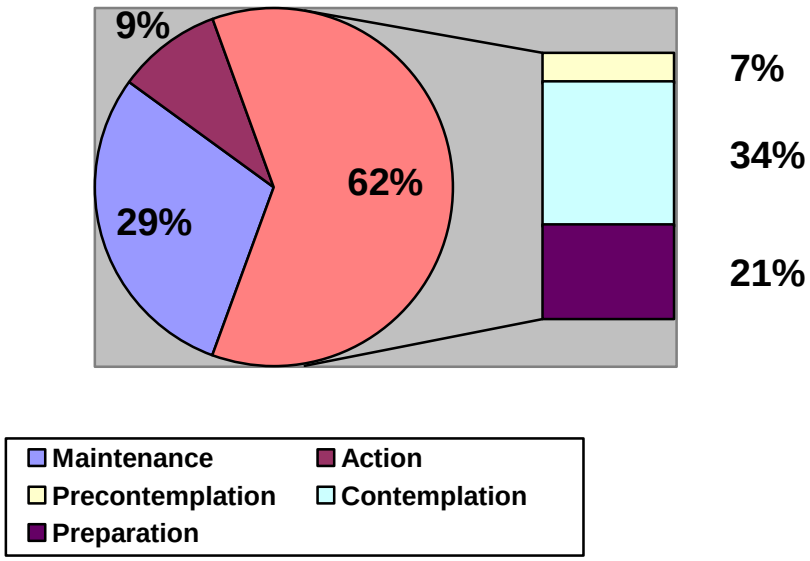
Fruits and Vegetables Survey

A total of 86 Hispanic parents or guardians completed the FVS in December of 2007. Upon completion of the survey, one was dismissed due to extremely high reported servings of FV. Thus, the presented data pertains to a total sample of 85 participants who completed the FVS. The average age was 30.0±5.7 years, consisting of 73 females (85.9%) and 12 males (14.1 %). More than half of the participants (60.5%) had less than 12 years of schooling, 29.1% had a high school diploma or GED, and 9.3% reported having some college or a college degree. Nearly fifty percent (48.8) of the parents/guardians surveyed reported not working outside of the home, 33.7% worked part-time, and 17.4% were considered to be full-time (Table 1).

	Frequency of Participants	Percent of Participants
School Years Completed*		
Less than 12 years school	52	60.5
High School Diploma or GED	24	29.1
Some College or College Degree	8	9.3
Employment Status		
Do not work outside home	41	48.8
Work Part-Time	29	33.7
Work Full-Time	15	17.4

* N= 85 (missing 1 for school years completed)

Based on the staging logarithm with regards to the intentions of parents/guardians to serve more fruits and vegetables, more than 60% of the participants were in the pre-action stages (6 individuals in precontemplation, 28 in contemplation, 18 in preparation). Thirty-nine percent of the participants were in the action and maintenance stages for serving more than 2 ½ cups of FV to their children for more than 6 months (8 in action, and 25 in maintenance) (Figure 1).

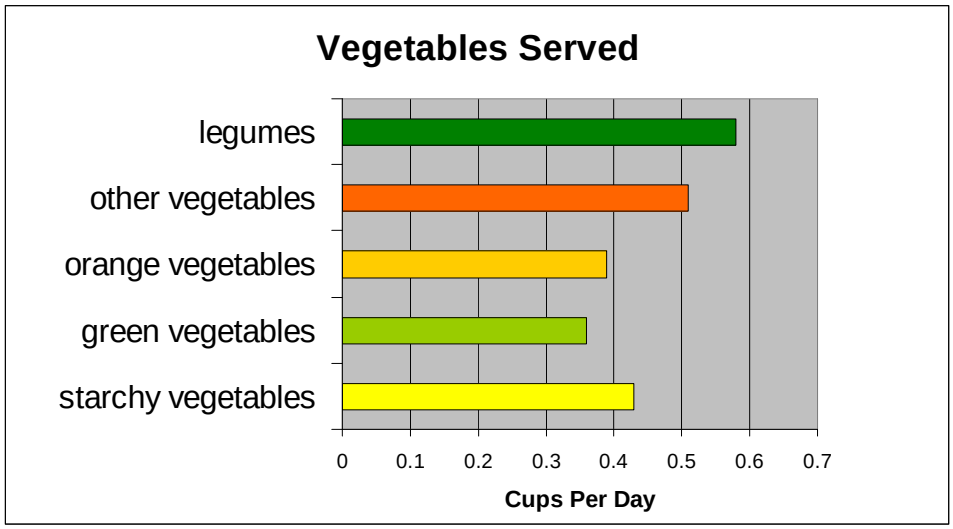


The results of the FVS indicated that the intentions to serve more FV of parents/guardians categorized in lower SOC were significantly hindered by the cost of FV as well as the amount of time required to purchase and prepare FV compared to those parents/guardians in the later SOC ($p=0.029$). Hispanic parents/guardians in lower SOC served significantly smaller amount of FV to their children ($p<0.001$). Including juice, the average total FV served by parents/guardians in pre-contemplation SOC was 3.4±1.3 servings per day. Parents/guardians in contemplation SOC served 4.6±2.6 servings per day. Those in preparation stage served 3.7±2.0 servings per day, while parents in action

stage served 4.1±.73 servings per day, and those in maintenance served 5.3±2.5 servings per day (Table 2).

Stage of Change	FV Servings per Day
Pre-contemplation	3.4±1.3
Contemplation	4.6±2.6
Preparation	3.7±2.0
Action	4.1±.73
Maintenance	5.3±2.5

The total amount of FV servings per day was 4.5±2.3. The average reported amount of fruit served per day was 1.39±1.2 without 100% FJ and 2.85±2.36 including FJ. Total amount of vegetables served was 2.16±2.3 cups per day. Of the vegetables, legumes were served in the highest amounts with an average of 0.6 cups, followed by other vegetables (0.5 cups), starchy vegetables (0.4 cups), orange vegetables (0.4 cups), and green vegetables (0.4 cups). (Figure 2)



Focus Groups

A total of 27 Hispanic parents/guardians completed three focus groups. The results of the focus groups provided insight into the types of FV preferred by children and

served by parents/guardians. The focus groups also provided information on factors relating to the amounts of FV served by parents/guardians. Both the FVS and the focus groups were in agreement that parents/guardians served higher amounts of fruits than vegetables, however the groups went on to reveal that this was primarily due to the preference of their children. Concerning fruits, parents/guardians demonstrated knowledge with regards to fruit preparation; stating that peeling, slicing, cutting, and accessibility were all important in order for the child to consume specific fruit. Bananas, apples, oranges, and melons were reported most often as being the preferred fruit by children, and many parents/guardians reported using this preference in providing snacks for the children as demonstrated in this statement "FV are healthier than a bag of chips. They are better than fried food or food with a lot of spices". Health and prevention of sickness was most commonly reported as reasoning for eating fruits and vegetables as evidenced in the following statements: "I promote oranges in this season to decrease the flu or colds. In the cold season we buy only oranges," "My son doesn't eat veggies and is sick every 3 months. His immune system is low and I have to give him vitamins". Parents/guardians did not report having to justify fruit consumption to their children. Cost was not reported as an issue with regards to fruit purchasing during the focus groups.

Discussion concerning vegetables revealed different results, with a number of parents/guardians reporting that their children refused to eat vegetables; "My 5 year old son used to eat FV before the age 3, but after 3 he doesn't like veggies". Parents/guardians demonstrated some knowledge of the importance for children to eat vegetables by stating they would often try to "hide" the vegetable in soups or other

dishes: “For my younger son I have to grind the vegetables and hide them in the food so he doesn’t see them”. Many parents/guardians were unsure as to the reasons behind the importance of vegetables within the diet. Broccoli and carrots were reported as being the most preferred vegetable among children, with a number of parents/guardians reporting “eyesight” as benefit/need in relationship to carrots. Parents/guardians also reported encouraging their children to eat vegetables in order to “grow big and strong” with the hopes that they would increase consumption. The parents/guardians reported difficulty in eating FV when eating out in restaurants (i.e., “Sometimes the salad bars have veggies that are not fresh and don’t look appealing,” “Sometimes restaurants don’t have salads but have veggies mixed with other foods. Sometimes I want to eat fresh fruit but don’t see it.” A number of parents/guardians reported that they did not want to think about FV while eating out: “It is the only day I get to eat different” and “Veggies are the last thing I think about when dining out.” Many parents/guardians raised a number of concerns regarding preparation of vegetables, and reported an interest in education on food preparation and recipes. Cost and time were not cited as major issues for vegetable purchasing or preparation.

CHAPTER V

CONCLUSION

Discussion

The main purpose of the study was to assess the amount of FV being served by parents/guardians to their pre-school age children in low-income Hispanic families. The second objective of the study was to determine the distribution of the parents/guardians across SOC for serving FV to their children and to identify important factors that influence the availability and accessibility of FV in this target population. The mixed-method approach utilizing the FV survey and focus groups provided insight regarding the amounts and types of FV being served, as well as the factors which influence the availability and accessibility, and motivating factors for the parents.

The results of the study revealed interesting trends within the sample of low-income Hispanic families and found significant differences related to FV between parents across the SOC. While parents/guardians in the higher SOC served 5.3 servings of FV per day to their pre-school age children, parents in the lower SOC did not serve the recommended 5 servings of FV per day (Cassady et al., 2007). It was not surprising that only 30% of the parent/guardians were in action and maintenance, however it was

surprising that the amount of FV served was so close to the recommendations. The findings of the study also showed FJ to be a major contributor to the total amount of fruits served to children, representing more than 50% of the total fruit served to children.

Previous research suggests that although 100% FJ is nutritionally superior to sugar-sweetened beverages, FJ may encourage excessive energy consumption and thus potentially increase the risk of overweight among children (Bensimhon et al., 2006; Freedman, Kettel Khan, Serdula, Srinivasan, & Berenson, 2001). In fact, a recent study of children aged 2-19 years by Wang (2008) found that increased FJ consumption was directly associated with higher BMI-for-age, with significant increases in black and Mexican-American subjects (Wang YC, 2008). This finding is of particular concern for low-income Hispanic children who are at an increased risk for overweight. (Kumanyika & Grier, 2006; Lutfiyya et al., 2008). According to NHANES data from 2003-2004, 18.3% of Hispanic boys and 14.1% of Hispanic girls are overweight, though this is less than the general population with 19.1% of Caucasian boys and 15.4% of Caucasian girls overweight (Ogden et al., 2006). The relatively high amount of FJ that parents served to their children in our study may be partly explained by the parent/guardian's socioeconomic status (O'Dea, 2003). Because the majority of our parents/guardians reported participating in WIC, they received 100% FJ for their children on a regular basis which naturally increased the availability and consumption of FJ in their families. Because high FJ consumption has been linked to excessive calorie intakes, inadequate fiber consumption (Nicklas et al., 2001), as well as decreased consumption of milk among children (Dennison et al., 1997), parents should focus on serving whole fruits to

their children and become familiar with the additional benefits of whole fruits compared to FJ (Faith MS, 2006).

Parents in our study tended to serve more fruit than vegetables to their children and this finding was observed not only from the analysis of the FVS but also the content analysis of the focus groups. The majority of our parents indicated that their children preferred fruits over vegetables. This finding is consistent with the CDC reports that Hispanics have the highest fruit consumption at 37.2% compared to non-Hispanics with 31.2%, but the lowest vegetable intake at 20.4% compared to non-Hispanics at 28.6% (CDC 2007). Our findings are also consistent with previous research on taste preferences among children where preference for fruit over vegetable is common (Cooke et al., 2004; Wardle et al., 2005), largely due to the sweet taste of fruits, which is often preferred among children. It is for this reason that literature recommends parents introduce babies to vegetables before fruits in order for them to acquire a taste first (Satter, 1987). According to the FVS, legumes were served in the largest amounts by parents; however, none of the parents reported beans when discussing their child's FV intake during the focus groups. Thus, it is possible that many Hispanic parents were unaware of the fact that legumes belong in the vegetable group considered which illustrates the need for increased nutrition education in this population. The analysis of FVS revealed that cost and time needed to prepare FV were impeding factors to serving more FV among parents/guardians in our sample. However, parents in the focus groups gave little concern to cost or the time for shopping and preparation as a factor in FV availability and consumption in their families. Our findings from the focus group analysis are contrary to

previous research that identified cost and time to represent significant barriers to higher FV consumption for low-income families (Perez-Lizaur et al., 2008; Quan et al., 2000).

The focus groups participants were aware of the need to prepare FV on a regular basis and make FV accessible to their young children. While some reported preparing FV themselves, indicating little concern for the time involved, others reported purchasing pre-cut and prepared FV indicating little concern for the cost. The fact that the parents did not see time as a barrier to making FV available to their children could be in part due to the fact that the majority of the parents in our sample did not work outside the home. Given the demographic and SES characteristics of our sample, future studies should examine factors related to FV availability using a large and representative sample of Hispanic parents in order to allow for generalization of the findings.

Although some parents/guardians reported using flavoring such as lemon, salt, or sugar in order to encourage children's FV consumption, the majority indicated a low level of confidence and was interested in learning how to prepare FV to their children, especially tasty and easy meals with vegetables. It is important to note that the self-confidence for preparing FV was lower among the parents in lower SOC compared to the parents in higher SOC. These findings are consistent with the theoretical framework of utilized in our study. According to the TTM model, confidence in one's ability to perform a new behavior helps move individuals from lower to higher SOC (Feldman et al., 2000). Because the majority of parents in our sample were in lower SOC (61.2%), it is not surprising that their self-efficacy for preparing and serving FV was lower than the 30% of the parents who were in the action and maintenance stage during our study. The lack of self-efficacy among our parents was noted especially in regard to vegetables,

where many parents reported giving up on vegetable preparation since their children were not interested in eating them.

A number of parents/guardians referred to health benefits as being a positive factor that encouraged them to serve more FV to their children. Avoidance of illness, proper growth, and obesity prevention frequently came up as motivating factors for serving FV. While these results indicate a certain level of knowledge related to FV benefits, other parental responses during the focus groups indicated a need for nutrition education in this area. Many parents were confused as to the nutrients provided from different fruits and vegetables as well as the altering effects of various cooking methods. There was general agreement between parents/guardians that FV are important and children should eat them on a regular basis.

In regard to FV and dining out, parents/guardians reported difficulty selecting FV when eating out in restaurants and many admitted they did not want to make such selections referring to eating out as a time of "treat" or "the only day I eat pizza". Participants tended to explain the dangers of eating "fast food" with significant emphasis on "hamburgers" and "fried foods;" however, they admitted to frequently letting their children to eat such foods. With an increased number of meals eaten outside the home (Jacobs, 2006), it is essential for parents to make healthier food selections not only for themselves but also for their children when dining out. Research has shown that eating meals away from home often results in increased portion size, excess energy intake, and insufficient FV intake (Ackroff et al., 2007; Jacobs, 2006). Making healthy food choices when eating out and explaining them to their children (parent modeling) will encourage healthier selections that will carry on into adulthood. Previous research has shown that

parent modeling is an excellent way to instill habits in children (French & Stables, 2003; Nicklas et al., 2001; Tibbs et al., 2001). The majority of parents/guardians reported failure to model healthy eating to their children when eating out which is understandable since the majority were in pre-action stages for serving more FV to their children.

Limitations of the Study

The study was effective in accomplishing the main purpose of assessing the amount and type of FV that were served by parents to pre-school age children in low-income Hispanic Head Start families. The study also successfully determined the parent's level of SOC for serving more FV to their children, as well as identified contributing factors to the availability and accessibility of FV in the target population. However, there were a few limitations of the study that should be noted. The study sample was relatively small and participants were selected from only two Head Start sites. Thus, the use of a larger and representative sample of Hispanic Head Start parents in Tulsa, including additional geographic areas, would increase the general application of the findings. As with all self-reported surveys, there are potential issue related to validity and reliability of the subject's responses in our study. Thus, it is possible that the parents in our sample overestimated or underestimated the amount of FV they served to their children. Additionally, it is possible that some parents did not feel comfortable during focus groups and felt the need to answer with the "correct" response to the questions related to their own FV attitudes, practices and behaviors.

Implications for Practice and Future Research

Based on the results of this study, low-income Hispanic parents did not serve the recommended amount of FV to their pre-school age children, with parents in lower SOC serving less FV than parents in higher SOC. The results of our study also indicate that the majority of parents were in the pre-contemplation stages of the SOC. Given the relatively low level of parental self-confidence for preparing FV in our study, low-income Hispanic parents would benefit from increased practical skills such as preparing easy and tasty FV recipes as well as increased nutrition knowledge related to FV health benefits. Our focus groups findings illustrated that the parents were ready and willing to learn, and showed interest in future nutrition workshops. Thus, effective nutrition education programs should be developed to increase parental self-efficacy for serving FV in this target population through nutrition education classes, hands on cooking classes, and other FV related activities.

Given the limitations of our study, there is also a need for further research that would utilize random sampling and a larger and diverse sample of low-income Hispanic families with pre-school age children. In addition, there is currently very little research pertaining to the relationship between acculturation and FV availability in Hispanic families. Therefore, future studies are needed in this area to further our understanding of cultural influences on FV consumption and availability among Hispanic population living in the U.S.

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APPENDICES

Appendix A

Oklahoma State University Institutional Review Board

Date:	Monday, August 13, 2007
IRB Application No	HE0746
Proposal Title:	Assessing Determinants of Fruit and Vegetable Consumption in Low-Income, Minority Pre-School Age Children in Urban Oklahoma
Reviewed and Processed as:	Expedited

Status Recommended by Reviewer(s): Approved Protocol Expires: 8/12/2008

Principal Investigator(s)

Lenka Humenikova
308 HES
Stillwater, OK 74078

Deana Hildebrand
304 HES
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,

Sue C. Jacobs, Chair
Institutional Review Board

Oklahoma State University Institutional Review Board

Date	Thursday, November 15, 2007	Protocol Expires:	8/12/2008
IRB Application	HE0746		
Proposal Title:	Assessing Determinants of Fruit and Vegetable Consumption in Low-Income, Minority Pre-School Age Children in Urban Oklahoma		
Reviewed and Processed as:	Expedited **Modification**		

Status Recommended by Reviewer(s) **Approved**

Principal Investigator(s) :

Lenka Humenikova
417 HES
Stillwater, OK 74078

Deana Hildebrand
304 HES
Stillwater, OK 74078

The requested modification to this IRB protocol has been approved. Please note that the original expiration date of the protocol has not changed. The IRB office MUST be notified in writing when a project is complete. All approved projects are subject to monitoring by the IRB

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

Signature : Sue C Jacobs

Sue C. Jacobs, Chair, OSU Institutional Review Board

Thursday, November 15, 2007
Date

APPENDIX B

Okla. State Univ.

Approved 2/29/08
8/12/08

Informed Consent for Participants

Focus Groups

Project Title: **Assessing Determinants of Fruit and Vegetable Consumption in Low-Income Minority Pre-School Age Children in Urban Oklahoma.**

Investigators: This research is being carried out by Lenka Humenikova, PhD., Deana Hildebrand, and Nancy Betts; PhD, RD, from the Department of Nutritional Sciences at Oklahoma State University.

Purpose: We would like to invite you to be part of a research project that will tell us more about how families with young children think about eating more fruits and vegetables. You are being asked to participate because you have a child that is between the ages of 2 to 5 years, and you are enrolled in the Community Action Early Childhood Program (Head Start program). You will be asked questions related to fruit and vegetable consumption and availability of fruits and vegetables in your household.

Procedures: You will be asked to participate in a discussion session during which you will be asked questions related to your behaviors, thoughts, and attitudes about fruits and vegetables. Your thoughts are important because they will help nutrition educators know more about why parents of young children do or don't serve and eat fruits and vegetables. The information will be used to plan nutrition education.

Several other parents will be present to share their thoughts related to fruits and vegetables during your discussion group session. The session will take about 1 hour and it will take place in your Head Start site. We will ensure that the discussion session is scheduled at the time that is convenient for you and your family.

Risks of Participation: There are no known risks associated with this project which are greater than those you normally have in daily life.

Benefits: The participation in the discussion session will help you explore your own beliefs, thoughts, and possible barriers related to serving and consuming fruits and vegetables in your family.

Compensation: If you decide to participate in this research project, you will be offered **$25**. This incentive will be offered to you during one of your visits at the Head Start site after you reviewed this document and participated in the discussion session. The incentive will be given to you by one of the research investigators or your regular Head Start teacher or nutrition educator.

Confidentiality: You will not have to use your full name or any other information during the discussion session. The discussion will be audio-taped so we can analyze the discussion session later for research purposes. In order to find out which comments came from the same individual, you will be asked to identify

yourself using a name of your choice (you can use your first name only or any other name of your choice) during the discussion.

The records of this study will be kept private. Any written results will discuss group findings and will not include information that will identify you or your child. Research records will be stored securely and only researchers and individuals responsible for research oversight will have access to the records. It is possible that the consent process and data collection will be observed by research oversight staff responsible for safeguarding the rights and wellbeing of people who participate in research.

Contacts: If you have any questions about this project contact Lenka Humenikova at 405-744-8285, or Deana Hildebrand at 405-744-5059. For information on subject's rights, contact Dr. Shelia Kennison, Institutional Review Board Chair, 219 Cordell Hall, Stillwater, OK 74078, 405-744-1676 or irb@okstate.edu.

Participant Rights: Your participation is voluntary and you have the right to stop participating in the discussion session at any time.

Signatures:

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy of this form has been given to me.

_____ _____

Signature of Participant Date

I certify that I have personally explained this document before requesting that the participant sign it.

_____ _____

Signature of Researcher Date

Informed Consent for Participants

Focus Groups

Project Title: **Assessing Determinants of Fruit and Vegetable Consumption in Low-Income Minority Pre-School Age Children in Urban Oklahoma.**

Investigators: This research is being carried out by Lenka Humenikova, PhD., Deana Hildebrand, and Nancy Betts; PhD, RD, from the Department of Nutritional Sciences at Oklahoma State University.

Purpose: We would like to invite you to be part of a research project that will tell us more about how families with young children think about eating more fruits and vegetables. You are being asked to participate because you have a child that is between the ages of 2 to 5 years, and you are enrolled in the Community Action Early Childhood Program (Head Start program). You will be asked questions related to fruit and vegetable consumption and availability of fruits and vegetables in your household.

Procedures: You will be asked to participate in a discussion session during which you will be asked questions related to your behaviors, thoughts, and attitudes about fruits and vegetables. Your thoughts are important because they will help nutrition educators know more about why parents of young children do or don't serve and eat fruits and vegetables. The information will be used to plan nutrition education.

Several other parents will be present to share their thoughts related to fruits and vegetables during your discussion group session. The session will take about 1 hour and it will take place in your Head Start site. We will ensure that the discussion session is scheduled at the time that is convenient for you and your family.

Risks of Participation: There are no known risks associated with this project which are greater than those you normally have in daily life.

Benefits: The participation in the discussion session will help you explore your own beliefs, thoughts, and possible barriers related to serving and consuming fruits and vegetables in your family.

Compensation: If you decide to participate in this research project, you will be offered **$25**. This incentive will be offered to you during one of your visits at the Head Start site after you reviewed this document and participated in the discussion session. The incentive will be given to you by one of the research investigators or your regular Head Start teacher or nutrition educator.

Confidentiality: You will not have to use your full name or any other information during the discussion session. The discussion will be audio-taped so we can analyze the discussion session later for research purposes. In order to find out which comments came from the same individual, you will be asked to identify

yourself using a name of your choice (you can use your first name only or any other name of your choice) during the discussion.

The records of this study will be kept private. Any written results will discuss group findings and will not include information that will identify you or your child. Research records will be stored securely and only researchers and individuals responsible for research oversight will have access to the records. It is possible that the consent process and data collection will be observed by research oversight staff responsible for safeguarding the rights and wellbeing of people who participate in research.

Contacts: If you have any questions about this project contact Lenka Humenikova at 405-744-8285, or Deana Hildebrand at 405-744-5059. For information on subject's rights, contact Dr. Sue C. Jacobs, Institutional Review Board Chair, 219 Cordell Hall, Stillwater, OK 74078, 405-744-1676 or irb@okstate.edu.

Participant Rights: Your participation is voluntary and you have the right to stop participating in the discussion session at any time.

Signatures:

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy of this form has been given to me.

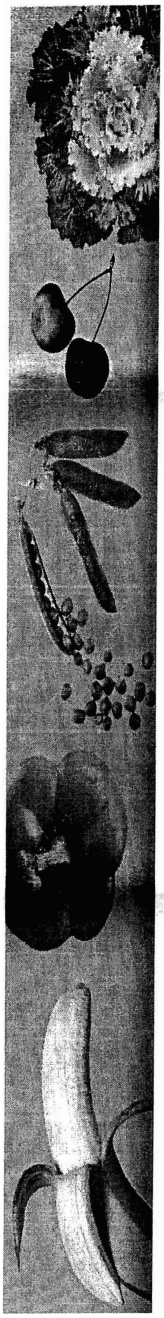
_____ _____

Signature of Participant Date

I certify that I have personally explained this document before requesting that the participant sign it.

_____ _____

Signature of Researcher Date



APPENDIX C

Are your kids picky eaters?

Would you like for your children to eat more fruits and vegetables?

You are invited
to join in a discussion group
with parents and caregivers of children aged 2 to 5 years to share ideas for helping children eat more fruits and vegetables.

Date
Time
Place

You will receive $25.00 for your participation.

If you are interested in participating please read and sign the attached form and return it to your child's Head Start teacher by date.

The discussion group will last for about 1 hour while your child is in school. It is part of a project being conducted by Oklahoma State University Nutritional Sciences Department in cooperation with the Tulsa Community Action Early Childhood/Head Start Program. The information you share will be confidential. It will be used by nutrition educators to better understand why children do or do not eat fruit and vegetable and to provide nutrition education programs that best meet the needs of families with young children.

Thank you for your consideration.

Participant Informed Consent Information Sheet

Fruit and Vegetable Survey

Project Title: **Assessing Determinants of Fruit and Vegetable Consumption in Low-Income Minority Pre-School Age Children in Urban Oklahoma.**

Investigators: This research is being carried out by Lenka Humenikova, PhD., Deana Hildebrand, and Nancy Betts; PhD, RD, from the Department of Nutritional Sciences at Oklahoma State University.

Purpose: We would like to invite you to be part of a research project that will tell us more about how families with young children think about eating more fruits and vegetables. You are being asked to participate because you have a child that is between the ages of 2 to 5 years, and you are enrolled in the Community Action Early Childhood Program (Head Start programs). You will be asked questions about what you think when deciding or not deciding to eat and serve your child fruits and vegetables

Procedures: You will be asked to complete a survey related to your behaviors, thoughts, and attitudes about fruit and vegetables. Your thoughts are important because they will help nutrition educators know more about why families with young children do or don't eat fruits and vegetables. The information will be used to plan nutrition education.

The completion of the survey will take about 10 minutes. You will be given the option of completing the survey when you drop your child off in the Head Start site or taking the survey home and returning it at the time of your next Head Start site visit. We will ensure that the completion of the survey is convenient for you and your family. If there is a part of the survey or a question you do not understand you may ask for help at the Head Start site.

Risks of Participation: There are no known risks associated with this project which are greater than those you normally have in daily life.

Benefits: Parents who have completed the survey before said it helped them better understand their own thoughts and why they may or may not include more fruits and vegetables in their child's meals and snacks.

Compensation: If you decide to participate in this research project, you will be offered **$15**. This incentive will be offered to you during one of your visits at the Head Start site after you complete the survey (or return the completed survey). The incentive will be given to you by one of the research investigators or your regular Head Start teacher or nutrition educator.

Confidentiality: You will not be asked to put your name on the survey. We will not be able to identify your individual responses. The surveys will be kept in a locked

file while data is being entered and analyzed. Information will be maintained for a period of two years and then destroyed. The information obtained in this study may be published in scientific journals or presented at scientific meetings, but only group information will be shared. No one will know that you completed a survey or how you answered.

The Oklahoma State University Institutional Review Board has the authority to inspect consent records and data files to be sure the rules are followed.

Contacts: If you have any questions about this project contact Lenka Humenikova at 405-744 8285, or Deana Hildebrand at 405-744 5059. For information on subject's rights, contact Dr. Sue C. Jacobs, Institutional Review Board Chair, 219 Cordell Hall, Stillwater, OK 74078, 405-744-1676 or irb@okstate.edu.

Participant Rights: Your participation is voluntary and you have the right to stop participating in the study at any time.

If you would like to participate please complete the attached survey. You may keep this information sheet for future reference.

After you complete the survey please give it to your Head Start teacher or Nutrition Educator (depending on who is present at the Head Start site when you complete the survey or drop the survey off).

Thank you for your time.

APPENDIX E

Would you like for your children to ea more fruits and vegetables?

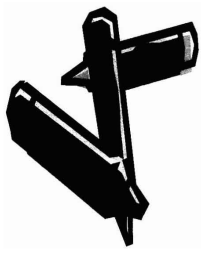
You are invited to participate in a research study about fruit and vegetables. We are asking you to fill out a survey about your feelings, behaviors, and attitudes related to fruit and vegetable consumption in your family.

You will receive $15.00 for your participation.

If you are interested in participating please talk to your child's Head Start teacher today and find out more about this project.

The survey will last for about 10-15 minutes. You can complete the survey when you drop your child off or when you pick your child up in the Head Start program. The survey is part of a project being conducted by Oklahoma State University Nutritional Sciences Department in cooperation with the Tulsa Community Action Early Childhood/Head Start Program. The information you share will be confidential. It will be used by nutrition educators to better understand why parents do or do not serve more fruit and vegetables to their children. The survey will help develop effective nutrition education programs that best serve the needs of families with young children.

Thank you for your consideration.



APPENDIX F

Fruit and Vegetable Survey

FRUIT AND VEGETABLE SURVEY

These questions are about you and your family. Please answer the questions in each box.

Are you the parent or main caregiver of a child that is 2 to 5 years old?	_____ Yes	_____ No
Is your 2 to 5 year old child enrolled in the WIC program?	_____ Yes	_____ No
Does your family receive food stamps?	_____ Yes	_____ No
If there are school age children living in your home, do they receive free or reduced price meals at school?	_____ Yes	_____ No
Does your family earn less than $2,035 before taxes <u>each month</u>?	_____ Yes	_____ No

Which race best describes you?
Place an "X" by the best answer.

_____ American Indian or Alaskan Indian

_____ Asian

_____ Black or African

_____ Native Hawaiian or Other Pacific Islander

_____ White

What is your ethnic background?

_____ Hispanic or Latino

_____ Not Hispanic or Latino

How old are you?

_____ years

What is your gender?

_____ male _____ female

How many years of school have you completed? Place an "X" by the best answer.

_____ Less than 12 years

_____ High school graduate or GED

_____ Some college or college graduate

How many hours did you work outside the home <u>last week</u> for paid wages or salary?

Place an "X" by the best answer.

_____ 1 to 32 hours (part-time)

_____ 32 hours or more (full-time)

_____ I did not work outside the home.

Intention to Serve Fruits and Vegetables

The next few questions ask about the amount of fruit and vegetables you serve your preschool age child each day, and if you plan to serve more fruits and vegetables to your child in the future.

Keep in mind:

- 1 cup of cooked or raw, cut-up fruit or vegetables is about the size of 1 baseball
- ½ cup serving is about the size of ½ of a baseball
- ¼ cup serving is about the size of a ping-pong ball or golf ball
- 1 piece of raw fruit (about the size of a baseball) = 1 cup
- 2 cups of salad = 1 cup vegetable
- 1 cup of 100% fruit or vegetable juice = 1 cup fruit

Instructions:
Answer question 1. Depending on your answer, go to question 2 or 3.

1. **How many cups of fruits and vegetables do you usually serve your preschool age child <u>each day</u>? Think about each of your meals and snacks as you add up the cups. Include the meals you eat away from home.**

   Put an X by the best answer.

   _____ 0 to 2¼ cups each day

   _____ More than 2½ cups

If you answered 0 to 2¼ cups, go to question 2.
If you answered more than 2½ cups, go to question 3.

Put an X by the best answer.

2. **Do you plan to start serving more than 2½ cups of fruit and vegetable to your preschool age child each day?**

   _____ **No**, I *do not* plan to serve more fruits and vegetables each day in the next 6 months.

   _____ **Yes**, I *do* plan to serve more fruits and vegetables each day in the NEXT 6 MONTHS.

   _____ **Yes**, I *do* plan to serve more fruits and vegetables each day in the NEXT 30 DAYS.

3. **How long have you been serving your preschool age child 2½ cups or more of fruits and vegetables each day?**

   _____ Less than 6 months

   _____ 6 months or more

Pros and Cons

How many fruits and vegetables you serve your preschool age child depends upon how important the pros (**benefits**) and cons (**hassles**) are to you.

Instructions:
Think about how important each of the following statements is to you. **If you disagree with a statement, or are not sure of how to answer, the statement is probably not important to you.**

Circle the best answer.

1. **Fruits and vegetables can be expensive.**

1	2	3	4	5
Not important	Slightly important	Somewhat important	Very important	Extremely important

2. **Vegetables and fruits help protect your preschool age child from diseases like cancer and heart disease.**

1	2	3	4	5
Not important	Slightly important	Somewhat important	Very important	Extremely important

3. **Sometimes it takes too much time to prepare fruits and vegetables.**

1	2	3	4	5
Not important	Slightly important	Somewhat important	Very important	Extremely important

4. **Eating fruits and vegetables can help keep your preschool age child from getting sick with colds and infections.**

1	2	3	4	5
Not important	Slightly important	Somewhat important	Very important	Extremely important

5. **Buying fruits and vegetables may mean more trips to the store.**

1	2	3	4	5
Not important	Slightly important	Somewhat important	Very important	Extremely important

6. **Eating fruits and vegetables can help your preschool age child members have a healthy weight.**

1	2	3	4	5
Not important	Slightly important	Somewhat important	Very important	Extremely important

Confidence

This part looks at **HOW CONFIDENT** you are about serving fruits and vegetables to your preschool age child in different situations. Being confident means that you know that you can do something.

Circle the best answer.

1. How **CONFIDENT** are you that you are able to serve your preschool age child vegetables and fruits when
you are preparing meals at home?

1	2	3	4
Not at all confident	Somewhat confident	Confident	Very confident

2. How **CONFIDENT** are you that you are able to serve your preschool age child vegetables and fruits when
you are eating meals away from home?

1	2	3	4
Not at all confident	Somewhat confident	Confident	Very confident

3. How **CONFIDENT** are you that you can **prepare tasty, easy recipes using fruits and vegetables?**

1	2	3	4
Not at all confident	Somewhat confident	Confident	Very confident

4. How **CONFIDENT** are you that you are able to serve your preschool age child fruits and vegetables when
you may be low on money for buying food?

1	2	3	4
Not at all confident	Somewhat confident	Confident	Very confident

5. How **CONFIDENT** are you that you are able to serve your preschool age child fruit and vegetables when
you do not have enough time to prepare fruits and vegetables?

1	2	3	4
Not at all confident	Somewhat confident	Confident	Very confident

Strategies for Serving More Fruits and Vegetables

These statements are about your thoughts, feelings, and experiences over the **past month** about serving fruits and vegetables to your preschool age child. They can affect what you choose to serve when it comes to fruits and vegetables.

Circle the best answer.

Over the past month, when you thought about what to serve your preschool age child, **HOW OFTEN** did you:

1. Look for tips on how to add more vegetables and fruits to meals?

1	2	3	4	5
Not at all	Hardly ever	Sometimes	Often	All of the time

2. Notice that grocery stores have more ready-to-eat fruits and vegetables?

1	2	3	4	5
Not at all	Hardly ever	Sometimes	Often	All of the time

3. Notice there are more healthy vegetables than before at the places where your family eats out?

1	2	3	4	5
Not at all	Hardly ever	Sometimes	Often	All of the time

4. Eat fruits and vegetables because it set a good example for your child?

1	2	3	4	5
Not at all	Hardly ever	Sometimes	Often	All of the time

5. Think that if your preschool age child ate more fruits and vegetables they would have fewer health problems?

1	2	3	4	5
Not at all	Hardly ever	Sometimes	Often	All of the time

6. Feel bad when you realized that you were not serving your preschool age child enough fruits and vegetables?

1	2	3	4	5
Not at all	Hardly ever	Sometimes	Often	All of the time

7. Serve more fruits and vegetables because you have decided that you would?

1	2	3	4	5
Not at all	Hardly ever	Sometimes	Often	All of the time

8. Choose to have or serve fruits and vegetables for snacks instead of junk foods?

1	2	3	4	5
Not at all	Hardly ever	Sometimes	Often	All of the time

9. Leave a bowl of fruit out for snacks?

1	2	3	4	5
Not at all	Hardly ever	Sometimes	Often	All of the time

10. Talk to other people about eating and serving your preschool age child more fruits and vegetables?

1	2	3	4	5
Not at all	Hardly ever	Sometimes	Often	All of the time

11. Give yourself a reminder to serve two vegetables with main meals?

1	2	3	4	5
Not at all	Hardly ever	Sometimes	Often	All of the time

12. Serve fruit instead of sweets for dessert?

1	2	3	4	5
Not at all	Hardly ever	Sometimes	Often	All of the time

13. Feel pleased when other people said you were being a good parent or caregiver because you served your preschool age child fruits and vegetables.

1	2	3	4	5
Not at all	Hardly ever	Sometimes	Often	All of the time

Fruit and Vegetable Food Frequency

This section is about the different **fruits and vegetables you usually serve your preschool age child**.

Please think about all the fruits and vegetables that you normally serve. Include:

- raw and cooked,
- eaten as snacks and at meals,
- eaten at home and away from home (restaurants, friends, take-out), and
- eaten alone and mixed with other foods.

*Circle how many times you usually serve each food and, if you serve the fruit or vegetable, how much you **usually** have.*
Choose the best answer for each question. Mark only one answer for each question.

1. How often do you serve **100% FJ** such as orange, apple, grape, or grapeFJ? Do not count fruit drinks like Kool-Aid, Sunny DeLite, lemonade, Hi-C, cranberry juice drink, Tang, and Twister. Include 100% juice you serve at all mealtimes and between meals.

Never (Go to question 2)	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	1 time a day	2 or more times a day

1a. Each time you serve **100% juice**, how much do you usually serve your 2 to 5 year old?

½ cup or less (small serving)	¾ cup (medium serving)	1 cup or more (large serving)

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2. How often do you serve **fruit**? Count any kind of fruit – fresh, canned, frozen, and dried.
   Do not count juices. Include fruit you serve at mealtimes and for snacks.

Never (Go to question 3)	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	1 time a day	2 or more times a day

2a. Each time you serve **fruit**, about how much do you usually serve your 2 to 5 year old?

less than ½ cup or ½ piece of fresh fruit (small serving)	½ cup or 1 piece of fresh fruit (medium serving)	more than ½ cup or more than 1 piece of fresh fruit (large serving)

VITA

Heidi Danielle Austin

Candidate for the Degree of

Master of Science

Thesis: FRUIT AND VEGETABLE INTAKE AMONG LOW INCOME HISPANIC FAMILIES WITH PRE-SCHOOL CHILDREN

Major Field: Nutritional Sciences

Biographical:

Personal Data:

Education:
Completed the requirements for the Master of Science in Nutritional Sciences at Oklahoma State University, Stillwater, Oklahoma in December, 2008.
Completed the requirements for a Bachelor of Science in Exercise Physiology at Oklahoma Baptist University, Shawnee, Oklahoma in May 2007.

Experience: Employed by Oklahoma State University, Department of Nutritional Sciences as a research assistant from August 2007 to June 2008. 2007

Name: Heidi Danielle Austin Date of Degree: December, 2008

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: FRUIT AND VEGETABLE INTAKE AMONG LOW INCOME HISPANIC FAMILIES WITH PRE-SCHOOL CHILDREN

Pages in Study: 77 Candidate for the Degree of Master of Science

Major Field: Nutritional Sciences

Scope and Method of Study:

The main purpose of this study was to assess the availability of fruits and vegetables (FV) in low-income Hispanic families with pre-school age children. The second objective was to determine the parental level of stage of change (SOC) for serving more FV to their children and to explore factors that influence FV availability in the target population. The study used a convenience sample from two Head Start sites in Tulsa, OK. It was a two phase study involving a previously validated Fruit and Vegetable Survey (FVS), followed by focus groups. Descriptive statistics, Analysis of Variance (ANOVA), and content analysis of focus groups were used to summarize the findings. SPSS 16.0 for Windows was used for statistical analysis. The level of significance was set at $p<0.05$.

Findings and Conclusions:

The results of the study showed that more than 60% of the subjects were in the pre-action stages for serving more FV to their pre-school age children. Only 39% of the participants were in the action and maintenance stages for serving more than 2 ½ cups of FV to their children for more than 6 months. The total amount of FV served by the participants was 4.5±2.3 servings per day (vegetable servings=2.16±2.3; fruit servings=2.85±2.36 w/ FJ). Subjects in lower SOC served significantly smaller amount of FV compared to subjects in higher SOC ($p<0.001$). Nearly 50% of the fruit servings were served in the form of fruit juice. The intentions of subjects to serve more FV in lower SOC were significantly hindered by the cost of FV and the amount of time required to purchase and prepare FV compared to subjects in the higher SOC ($p=0.029$). The results of the focus groups revealed that subjects had relatively low self-efficacy for preparing FV to their pre-school age children. Effective nutrition education programs should be developed to decrease barriers to FV availability such as cost and time and to increase parental self-efficacy for serving FV in low-income Hispanic families with pre-school age children.

ADVISER'S APPROVAL: Dr. Lenka Humenikova Shriver